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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/960,517	09/24/2001	Hitoshi Aoki	900-400	7216

7590 07/05/2002
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EXAMINER

THOMAS, TONIAE M

ART UNIT	PAPER NUMBER
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2822

4

DATE MAILED: 07/05/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/960,517

Applicant(s)

AOKI, HITOSHI

Examiner

Toniae M. Thomas

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 September 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 13-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 September 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3. 6) ☐ Other: _____

DETAILED ACTION

Introduction

1. This action is a first Office action on the merits of Application 09/960,517 filed on 24 September 2001.

Currently, claims 1-17 are pending.

Election/Restrictions

2. Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-12, drawn to a product, classified in class 257, subclass 314.
- II. Claims 13-17, drawn to a process, classified in class 438, subclass 257.

3. The inventions are distinct, each from the other because of the following reasons: inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the product as claimed can be made by another and materially different process. For example, the product as claimed could be made by a process, wherein the first, second, and third ion implanting steps are performed after forming the second electrode.

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4. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

5. During a telephone conversation with Mr. Warren Burnam on 05 June 2002 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-12. Affirmation of this election must be made by applicant in replying to this Office action. Claims 13-17 have been withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in–

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

6. *Claims 1-7 and 10-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Su et al. (US 6,133,096).*

Su et al. discloses a semiconductor device (see figs. 6, 7B, 8-12 and accompanying text). The semiconductor device comprises the following elements: a semiconductor substrate 1 of a first conductivity type; a first electrode 7b on the

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substrate with an intervening gate insulation film 6; a second electrode 10 on the first electrode with an intervening intermediate insulation film 9; and a pair of impurity regions of a second conductivity type, the impurity regions comprising a low concentration impurity region 17, an intermediate concentration impurity region 20, and a high concentration impurity region 23.

Silicide film 11 is provided on the second electrode (fig. 8), and silicide film 24 is provided on the high concentration impurity region 23 (fig. 12).

Sidewall insulation films 21 are provided on the sidewalls of the first and second electrodes (fig. 11).

The intermediate concentration impurity region 20 extends from the surface portion of the substrate to the inside of the substrate surrounding the high concentration impurity region (fig. 11).

The high concentration impurity region 23 is surrounded by the low concentration impurity region 17 and the intermediate concentration impurity region 20 (fig. 11).

Su et al. teach forming the first electrode 7b has a greater thickness than the second electrode 10 (col. 4, lines 25-28, 55-57).

The first electrode serves as a floating gate of a memory device, and the second electrode serves as a control gate of the memory device (col. 4, lines 38-40 and col. 5, lines 25-27).

Claim Rejections - 35 USC § 103

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. *Claims 8, 9, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Su et al.*

Su et al. do not teach the claimed concentration and depth for the low, intermediate, and high concentration impurity regions. However, given the general process disclosed in the prior art, it would have been within the ability of one having ordinary skill in the art to discover the claimed impurity concentration and depth for the low, intermediate, and high concentration impurity regions through routine experimentation. "Where general conditions of [a] claim are disclosed in prior art, it is not inventive to discover optimum or workable ranges by routine experimentation" (see *In re Aller, Lacey, and Hall* 105 USPQ 233 (CCPA 1955)). Therefore, impurity concentration and depth for the low, intermediate, and high concentration impurity regions is taken to be obvious over Su et al.

Su et al. do not teach that the second electrode entirely covers the first electrode, further extends to one side or opposite sides of the first electrode, or that the second electrode is disposed only on the first electrode having a smaller size than the first electrode. However, to align the source/drain regions with the second electrode, one having ordinary skill in the art would have been motivated to entirely cover the first electrode with the second electrode such that it further extends to one side or opposite

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sides of the first electrode; and to align the source/drain regions with the first electrode, one having ordinary skill in the art would have been motivated to dispose the second electrode only on the first electrode and having a smaller size than the first electrode.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toniae M. Thomas whose telephone number is (703) 305-7646. The examiner can normally be reached on Monday through Thursday from 8:00 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (703) 308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

TMT

July 1, 2002



CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
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